ENGINEERING NEWS-RECORD

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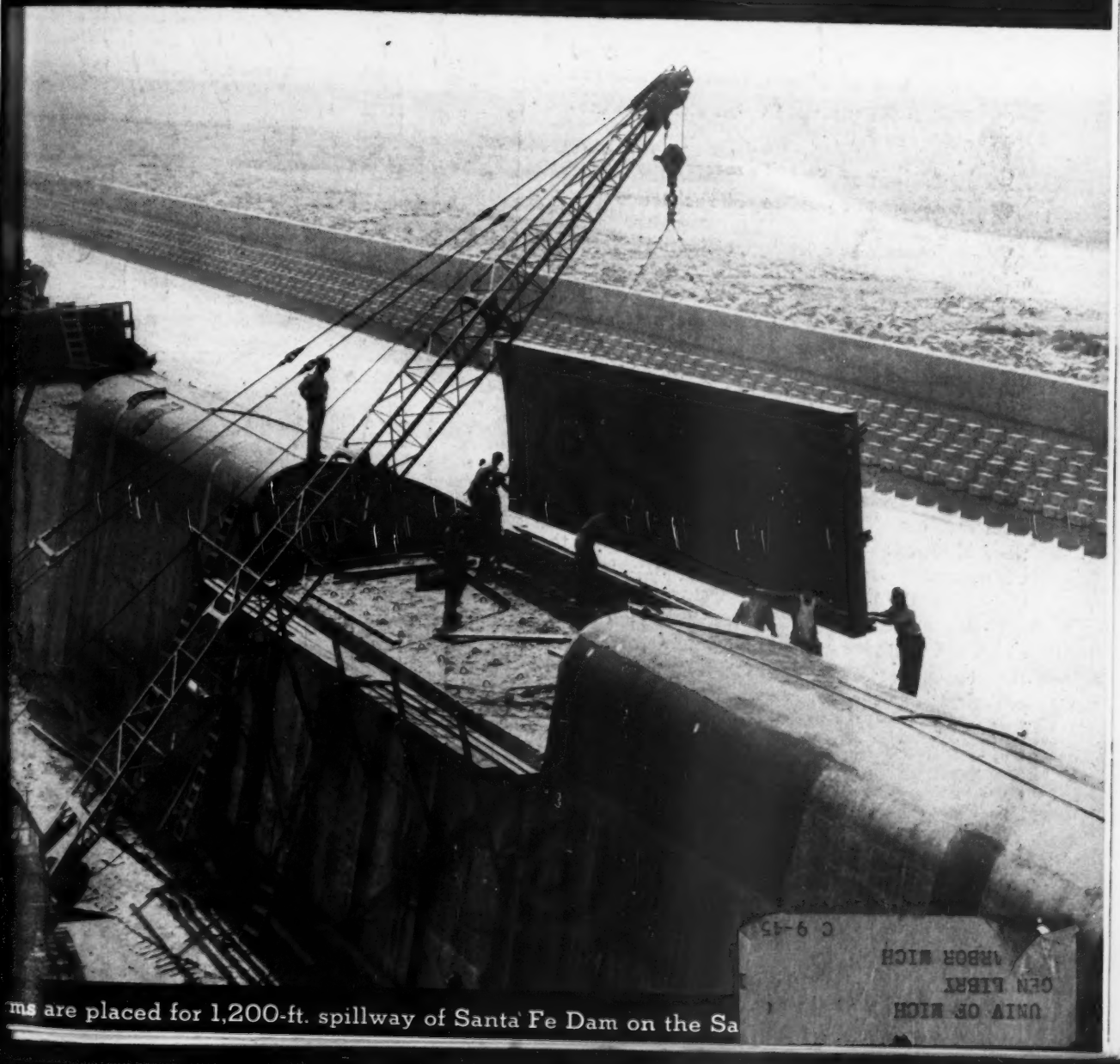

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VIBROFLOTATION

MODERN METHOD OF SANDY SOIL COMPACTION

EMPLOYS ELECTRIC VIBRATOR AND WATER

Motor-driven eccentric vibrator (left) is suspended on the crane boom (above) before it enters the soil which is to be compacted.

This New Process*

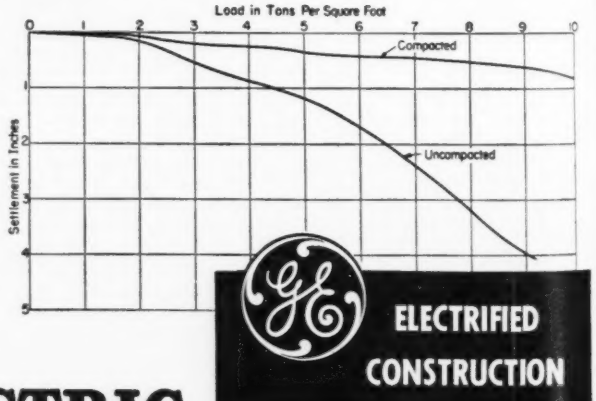
- **Increases the load-bearing capacity of soils, and of piles driven into this soil**
- **Diminishes the void volume and permeability of soils**
- **Diminishes active soil pressure**
- **Increases the passive soil resistance**

Vibroflotation uses a vertical, cylindrical vibrator† which "sinks" into the earth with the aid of a water jet; compaction being accomplished during withdrawal by the combined action of the water, or another suitable liquid, and the high-speed vibrations which tamp the soil particles. The vibrator is driven by a General Electric totally enclosed motor, specially designed to operate within the vibrator while it is submerged in wet sand.

The same inherent advantages of electric drive which have made possible many construction processes also contributed to the success of vibroflotation. Electricity controls the process, pumps the water, and drives the vibrator by flexible cable throughout the length of its vertical travel.

If you are contemplating electrification of your construction equipment, consult your General Electric representative for first-hand information on recent electrical developments which will help you build a more economical, safer construction tool. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

Curves (below) show how vibroflotation increases load-bearing capacity of soils, and reduces settlement.



* Vibroflotation was introduced in this country recently by Parsons, Brinckerhoff, Hogan and Macdonald, consulting engineers; and Merritt-Chapman and Scott, general contractors.

† Built by Baldwin Locomotive Works.

GENERAL ELECTRIC

656-58

ELECTRIFIED CONSTRUCTION

BETTER PRODUCT ★ LOWER COST

News of the Week

ENGINEERING NEWS-RECORD • MARCH 27, 1947 • VOLUME 138 • NUMBER 13

Railways urged to seek recruits among engineers

American Railway Engineering Association told of need for aggressive action—Bridge impact recommendations cause much discussion at Chicago meeting

Railroads must make railroading an attractive career for young engineers if they are to get and hold the large number of engineers that they need, according to a report submitted at the 46th annual meeting of the American Railway Engineering Association in Chicago last week by the association's Committee on Cooperative Relations with the Universities. The committee said that little can be accomplished by working with the universities until the railroads have created a demand on the schools for training for railroad work by paying salaries on a par with other large industries.

C. H. Mottier, vice-president and chief engineer of the Illinois Central System, said that a start in this direction has been made in the Chicago region where the heads of railroad engineering departments, after a study of a report on starting salaries prepared recently by the Engineers' Council for Professional Development, had decided to offer young engineering graduates $260 to $275 a month at the start. In this way they have been able to get some of the top men graduated from nearby colleges.

E. M. Hastings, chief engineer of the R. F. & P. Ry., called attention to a study just completed by the Engineers' Joint Council that put the railroads near the bottom of the list of large industries when those industries are evaluated on the basis of the percentage of engineers among their employees. The committee placed responsibility for correction of this condition squarely upon the present engineering officers of the various railroads.

A like view was expressed by J. B. Akers, chief engineer of the Southern Ry., in his opening address as president of the association. He said further that the senior officers should encourage the younger men to take part in the work of the AREA if it is to continue to be as effective as it should be in shaping sound policies with respect to engineering matters.

Following a somewhat similar line of reasoning, Robert S. Henry, assistant to the president of the Association of

Armstrong Chinn
Seated as new AREA president

American Railroads, said that the railroads can hope to prosper only through greater efficiency in the future, hence their need for more and better engineers is increasing rather than diminishing at this time.

Impact on bridges

Impact as an element of bridge design came up for active discussion twice during the meeting, first in connection with a report on the research being carried out under the supervision of the AREA and later when the Committee on Iron and Steel Structures offered revised methods for computing impact for inclusion in the AREA Manual. The research committee reported that it had studies in progress on viaduct columns, on open and ballasted-deck girder bridges and had begun tests on rigid frame structures. The girder tests include the effect of locomotives operating at speeds up to maximum permissible.

In commenting on the latter tests, E. M. Hastings questioned the advisability of undertaking new tests before the results of earlier studies had been analyzed and put into form for use by designers. He said data on the effect of high speeds would be especially useful at this time.

In explanation of the long delay in putting the test results into useful form, A. B. Chapman, speaking for the committee, said that the AAR research staff is handicapped by a lack of experienced structural engineers.

Later in the meeting, when the Committee on Iron and Steel Structures recommended revision of sections of the manual relating to impact, numerous members objected, asking that the recommendations be subjected to discussion for a year before going into the manual as they appear to call for quite radical changes. G. E. Robinson, engineer of structures of the New York Central System, Chicago, said that the methods proposed by the committee result in a decrease in the effect of impact on spans up to 40 ft., as compared with the formula now in the manual, and result in increases of considerable magnitude for longer spans.

E. S. Birkenwald, engineer of bridges, Southern Ry., chairman of the committee, said the formulas were the result of many tests made under the sponsorship of the Impact Committee but that he was willing to delay their inclusion in the manual. Mr. Birkenwald said further that the committee is working on a revision of the wind-load requirements now in the manual that will in large part offset the effect of these revised impact requirements in the longer spans.

Roadbed stabilization

Information of value to highway engineers troubled with pumping joints as well as to railway maintenance men was brought out in connection with the report of the Committee on Roadway and Ballast.

(*Continued on page* 10)

NEWS IN BRIEF

In telegraphic form, here are latest news developments on the engineering and construction front during the week.

Construction—Commercial Solvents Co. will build additional facilities this year to cost $1,180,000 at *Peoria, Ill.* . . . Construction of a 7,000-ft. tunnel at an estimated cost of $1,000 a foot will be needed because of grade difficulties in relocating tracks of the Burlington R.R. around Boysen Dam in *Wyoming*. . . . Public Service Commission has approved an $11,838,000 expansion program this year by the Michigan Consolidated Gas Co. mostly in the *Detroit* area. . . . Construction will start soon on a $1,000,000 building for the Mission Appliance Corp. and the Ideal Heater Corp. at *Los Angeles, Calif.* . . . *Indiana* legislature has authorized appropriations of over $26,000,000 for the construction and repair of state properties and parks. . . . Ground has been broken for a new 9-story city hall at *Birmingham, Ala.* . . . *Atlantic City, N. J.*, has applied for state funds for a $250,000 jetty at Absecon Inlet. . . . International Harvester Co. has contracted with the Struck Construction Co. for a $1,000,000 foundry at *Louisville, Ky.* . . . Building plans at *Philadelphia, Pa.*, include two new dormitories for Pennsylvania, state college at $3,000,000; the Northeast Airport, $5,000,000; and a senior high school, $4,000,000.

Highways—*Great Falls Mont.*, has tentative plans for street paving to cost $6,000,000. . . . Delaware State Highway Department may seek bids soon for an $800,000 viaduct to be built near *Elsmere, Del.* . . . A superhighway from *New York* to *Portland, Me.*, 330 miles, will represent an outlay of about $120,000,000. Maine will complete its part next fall, and Connecticut's link will be finished in 1949. Massachusetts' work, the bottleneck of the route, may be delayed several years unless special enactments by the legislature are pushed through, according to Philip H. Kitfield, chief engineer, Public Works Department, Massachusetts. Immediate construction plans call for a $2,250,000 improvement in Massachusetts' Newburyport Turnpike; New Hampshire has set aside $20,000,000 for a new highway parallel to U. S. Route 1, as part of the system, and Connecticut has spent $60,000,000 over the last 15 years, and has now only three short strips to complete.

Housing—The Springs Cotton Mills is building 200 homes for its workers at *Lancaster, S. C.* . . . Plans are made for apartments at *Kingsport, Tenn.*, to cost $2,200,000. . . . Work has started on a 135-residence development at *Broomall, Pa.* . . .*Trenton, N. J.*, will build a veterans' apartment center to cost $1,700,000. . . . Country Club Acres, Inc., has started a $1,000,000 development at *Northfield, N. J.* . . . A 50-unit apartment is planned at *Evansville, Ind.*

Water supply and sewers—*Gloucester, N. J.*, has plans for a $600,000 sewage disposal plant and incinerator. . . . Cranus Vollmerhausen Co. was low bidder at $890,070 for the War Department's sedimentation basin at the Balcaria filtration plant at *Washington, D. C.* . . . Many *Pennsylvania* communities have plans under way for sewerage systems, including over $5,000,000 of additions at *Scranton*.

Foundation nearly ready for new Maryland bridge

Another high-level bridge across the Delaware-Chesapeake Canal will be nearer with the completion in August of the sub-structure for a new span at Chesapeake City, Md. Authorized by Congress, Dec. 28, 1945, the construction of the new bridge is under the direction of Colonel F. F. French, U. S. Army Engineers. The New York firm of Parsons, Brinkerhoff, Hogan and MacDonald is consulting engineers.

Costing $1,153,000 the sub-structure is being built by the Fehlhaber-Pile Co. Inc., of New York.

The Chesapeake City bridge will be of high-level, fixed span, tied-arch construction and will have only a 24 ft 2-lane roadway. When completed, the main span, 540 ft. in length, will be high enough to give a clearance of 140 ft. above the water.

Cars will approach on a five per cent grade. With the steel girder approach spans, the bridge will stretch 3,954 ft 6 in. from abutment to abutment. A sidewalk, 4 ft. in width, will be on the east side of the concrete roadway.

No contracts for the superstructure have been let as yet.

***Montana Gets Registration Law**—Montana last week became the 48th state to make into law requirements for registration of civil engineers. Witnessing the climax of nearly 30 years of effort for such a law are members of the Montana Civil Engineers, who watch Gov. Sam C. Ford (seated) sign the bill. Standing, left to right, are: J. H. Morrison, Helena; W. J. Wenzel, Great Falls; E. H. Thomas, Helena; C. S. Heidel, Helena; John G. Link, Butte, and E. A. Dalakow, Helena.*

ENGINEERING NEWS-RECORD. Published every Thursday. Return postage guaranteed. Vol. 138, No. 13. Price 35c per copy. Allow at least ten days for change of address. All communications about subscriptions should be addressed to the Director of Circulation, 99-129 N. Broadway, Albany 1, N. Y., or 330 W. 42nd Street, New York 18, N. Y. Subscriptions, United States and U. S. Possessions, $6.00 for one year, $9.00 for two years, $12.00 for three years. Canada $7.00 for one year, $11.00 for two years, $14.00 for three years. Latin American countries $10.00 for one year, $16.00 for two years, $20.00 for three years. All other countries, $20.00 for one year, $30.00 for two years, $40.00 for three years. Please indicate position and company connection on all subscription orders. Entered as second-class matter October 29, 1936, at the Post Office at Albany, N. Y., under the Act of March 3, 1879. Printed in the U.S.A. Cable Address: "McGraw-Hill New York." Member A.B.P. Member A.B.C. Copyright 1947 by McGraw-Hill Publishing Company, Inc. All rights reserved. James H. McGraw, Founder and Honorary Chairman; JAMES H. McGRAW, JR., President; CURTIS W. McGRAW, Senior Vice-President and Treasurer; JOSEPH A. GERARDI, Secretary; NELSON BOND, Director of Advertising; EUGENE DUFFIELD, Editorial Assistant to the President; and J. E. BLACKBURN, JR., Director of Circulation. **Publication office: 99-129 North Broadway, Albany 1, N. Y. Editorial and Executive Office: 330 West 42nd St., New York 18.** District Managers and Branch Offices: Fred G. Hudson and L. H. Hunt, 520 N. Michigan Ave., Chicago 11; 738-39 Oliver Building, Pittsburgh; J. W. Otterson, 68 Post St., San Francisco 4; Aldwych House London, W. C. 2, England; Washington; J. M. Spackman, New York; A. B. Cozzens, Philadelphia; E. E. Duff, Jr., Cleveland; B. F. Horn, Detroit; W. E. Donnell, St. Louis; R. N. Phelan, Los Angeles; W. G. Payne, Boston; Ralph Maultsby, Atlanta, Ga.

Commerce Department launches plan to aid research for building industry

Implications of $1,500,000 research program to aid small business are seen significant to construction work

As part of a $1,500,000 comprehensive research program planned primarily to aid small business, the Commerce Department's Office of Technical Service is carrying out considerable work of significance to the construction industry. Eight contracts pertaining to building and totalling $200,000 have already been awarded, while three additional contracts directly benefiting the industry and amounting to $102,000 are to become effective in the next few days.

Since the funds available for contracts are much less than the amounts spent annually for research by many individual corporations, projects are not being approved if they are within the scope of work being carried on by another federal agency or if they can be financed equally well by non-government enterprise. The research will be carried out in cooperation with the American Standards Association, Producers Council, American Society for Testing Materials, the American Society of Civil Engineers, and other specialized groups of the construction industry.

A $65,000 contract pertaining to the modular coordination of construction materials to design has been awarded to Modular Service Association of Boston, which is a non-profit organization formed in 1938 under sponsorship of the American Institute of Architects and the Producers Council. Much has been done in the brick, door and sash industries in applying a 4-in. module in establishing dimensions and the aim is to extend this work.

Four contracts totalling $78,000 pertain to control of size variation and lamination of structural clay products, particularly brick. These are with Iowa State College, University of Illinois, New York State College of Ceramics, and the National Bureau of Standards. Each of the four organizations will carry out a special part of this program aimed at improvement of durability and control of size variation of the final product.

An $11,000 contract with Virginia Polytechnic Institute calls for the determination of the effect of brick texture on the bond between brick and mortar. Through this work it is hoped that the best texture for brick may be clearly determined.

The Elemendorf Corp., of Chicago—a private research organization—has been awarded a $37,000 contract to design a prefabricated housing system using a new type of wood veneer made from low-grade peeler logs at present unused and called "K-Veneer". The veneer is made ⅛ in. thick and is slit grain-wise at ½-in. intervals, leaving only enough fiber at the base of the incisions to hold the material together. As described briefly in *ENR* Feb. 27, 1947, vol. p. 347, the material is then expanded and "backed up" with a sheet of heavy paper, aluminum, steel, magnesium, or roofing felt. In preparing K-veneer, use is made of douglas fir, western hemlock, and other woods normally not used for plywood production and not utilized to any degree for housing work.

Flooring study

The University of Texas has been awarded a $13,000 contract for the development of satisfactory specifications for floors built as a combination of tile and concrete. Work will be centered on the use of a floor consisting of pre-cast beams, connected by spanner tile and covered by a concrete wearing course.

Largest of the pending contracts, which are expected to be awarded in a few days, calls for a $67,000 project for the Bureau of Mines to develop additional sources and improved commercial processing procedures for expanded mineral aggregates for light-weight concrete. Aggregates producing a concrete weighing from 20 to 80 lb. per cu. ft. will be developed with emphasis on the use of two principal raw materials [clay and volcanic ash].

A $15,000 project for the University of Minnesota to study methods of control of water permeability of walls built of structural facing tile is also pending. The aim in this work will be to develop construction methods and materials which will result in a wall of high moisture-resisting characteristics.

Arrangements are also being made for the University of Illinois to carry out a $20,000 study to improve "slab-on-ground" floor construction for low cost housing. The purpose is to develop a floor of good thermal and moisture resisting properties.

Proposed work that is receiving serious study, but for which no contracts have been worked out as yet, includes a project to improve spandrel wall construction in which light-weight concrete panels with metal facing are used for the non-bearing portions of the wall. Another proposed project is aimed at using sawdust, chips, and other wastes by combing these materials with rubber mastic for low-cost production of construction materials, such as building blocks. Also under study is a proposal to use fibrous materials as light-weight aggregate for producing building blocks and panels.

Tennessee plans to spend $21 million for building

A proposed building and repair program in Tennessee includes $4,000,000 for a state office building in Nashville; $6,000,000 for state college and special institutions; and $5,000,000 for several other school structures. Governor James McCord, in a recent message, asked the state legislature to validate a $21,000,000 bond issue for this purpose.

Mt. Morris Dam work to begin in June

Construction of the foundations of the Mt. Morris, N. Y., flood control dam on the Genesee River is expected to begin in June, according to Lt. Col. Harland C. Woods of the Buffalo District Office, U. S. Engineers.

Of the appropriation of $1,600,000 already received for the survey and construction work, about $450,000 has been expended and the remainder will go into further preliminary work and the construction beginning in June, according to Colonel Woods.

The first work will include the building of a cofferdam in the bed of the river and three sections of the base.

Approve Toledo program for mosquito control

The Ohio State Department of Health last week notified the Toledo Area Sanitary District it had approved the area's mosquito control program. The action will permit the mosquito control program to begin about the middle of April.

The first year's program will cost $118,693 but the cost will be less in subsequent years as the initial outlay for equipment is included in the first cost.

The control will consist of spraying and dusting, using various types of insecticides. The dusting will be done by a U. S. Government plane.

DEVELOPMENTS BEYOND U. S. BORDERS

Digested from report by Engineering News-Record correspondents and the McGraw-Hill World Wide News Bureau

Finland, France, other nations announce extensive programs for increasing power production—Brazil uses concrete rigid frames for factory—Close gap in Yellow River dike in China

Finland—The Imatra Power Co. (Imatran Voima Oy), Finland's principal supplier of electric power, has started work on two large-scale hydroelectric projects designed to double the company's capacity—now at about 128,000 kw.

Plans include developing the resources of the Oulu River in Northern Finland, transferring the power through transmission lines to the southern and eastern areas of the country, and improvement of existing plants. Construction will start shortly on new power stations at Pyha Falls (Phyakoski) and Jylhama Falls (Jylhomakoski).

Total capacity of the Pyha Falls plant—supplied by turbines purchased from Finnish, British and Swedish firms—will be 108,000 kw.; and at Pyha Falls the installation will produce 45,000 kw. Both plants are expected to be in operation by the end of 1949.

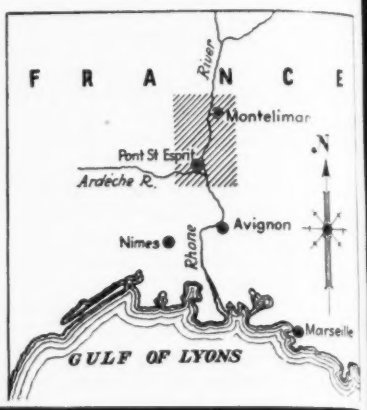
In addition to the two plants, a control dam will be built near the outlet of Lake Oulu to control the lake's water level. From the plant at Pyha Falls, a 400-mi. power line will be built to Hikia, in south Finland, where it will connect with the company's main power circuits.

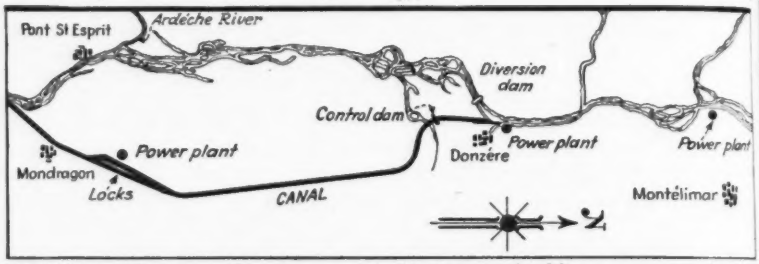
France—The second step of a TVA-type hydro-electric development plan for the Rhone River in southern France will soon be put under construction, according to the Compagnie Nationale du Rhone, which is planning the development.

First phase of the development project is Genessiat Dam on the upper Rhone (*ENR* Feb. 13, vol. p. 245) started in 1939 and destined finally to produce 1.6 billion kw.hr. per year. Second step—now about to get under way, will be what is called one of the world's largest combined canal-hydroelectric developments—a 17-mi. canal between the towns of Donzer and Mondragon that will carry 2-way barge traffic and feed turbines calculated to produce an annual average of 1.9 billion kw.hr. A third phase will be construction of a dam at Seyssel on the upper Rhone, where by 1950 the company hopes to produce another 200 million kw.hr. annually.

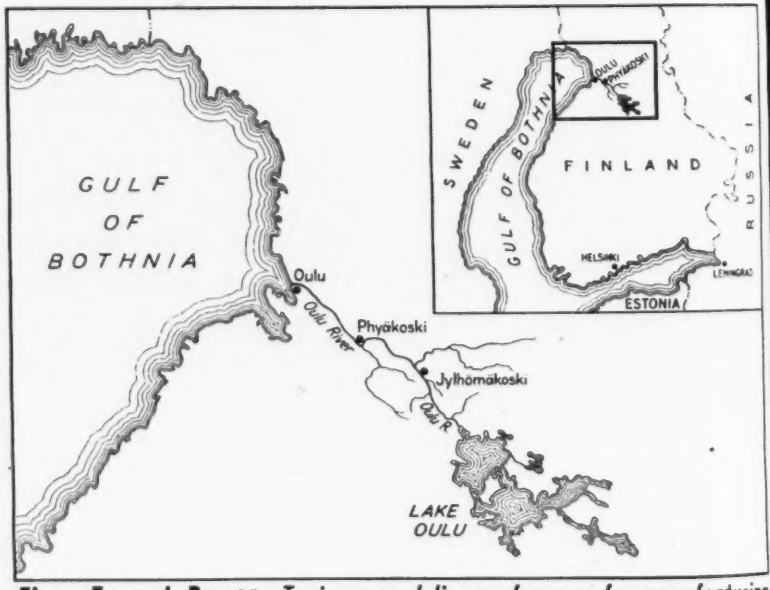
The CNR is owned at present by local chambers of commerce, local governmental agencies, power consumers in southern France and the Paris region (which will use a good portion of the output), and by the French National Railways. The national government is represented by five members of the board of directors.

The Donzere-Mondragon Canal (*ENR* Jan. 16, vol. p. 78) will be more than 100 yd. wide at water level, and





***"TVA" for France**—The Compagnie Nationale du Rhone, an organization paralleling the Tennessee Valley Authority in the United States, has started work on two great power projects shown on the map. Biggest job is Genissiat Dam, already well under way, and next is a combination canal-hydro scheme above Avignon, shown in detail in the strip map above.*



***Finns Expand Power**—To increase delivery of power for manufacturing plants in southern Finland around Helsinki, engineers are planning extensive development of the resources of the Oulu River and Lake Oulu in northern Finland. Development is expected to double the present output of the country's largest utility.*

will require moving some 35,000,000 cu.yd. of earth. A large part of the work must await the arrival of American construction equipment, according to Jean Bonnier, project engineer.

Just below the canal entrance from the river, a regulating structure will be built to maintain the canal water level. The canal's entrance itself (at the northern end) will be divided into two passages—one for navigation and the other leading into a silt-trap. The last two miles of the waterway will be within raised banks of permeable material, and banks in general will be concrete coated, although the bottom will have only a gravel covering.

The main power plant, situated about 12 miles downstream from the entrance, will contain six 66,000 hp. Kaplan turbines, driven by water falling about 70 ft. Before entering the powerhouse, the canal will be split into a power and a barge canal to permit river traffic to by-pass the plant.

Scotland—The North of Scotland Hydro Electric Board recently issued preliminary details of a $13,000,000 plan for development of power resources of the River Shira and the River Fyne.

• The project will include construction of two dams on the Shira, a 4½-mi. tunnel to carry the flow southward toward Lake Fyne, and a power station that will have a capacity of 40,000 kw.

South Africa—The Union of South Africa has announced it will invite American irrigation experts and officials of the Tennessee Valley Authority to visit South Africa to assist in a regional planning scheme for Orange Free State—a province of the Union. In a recent statement, the Union's Irrigation Department said it planned a vast irrigation scheme, to cost in the neighborhood of $45,000,000, to irrigate some 120,000 acres of land, and for the production of electric power.

Greece—Full development of Greece's river resources, including construction of hydroelectric projects with a total capacity nearly equal to that of the Boulder Dam plants in the United States, has been recommended by a United Nations investigating committee. The group was sent to Greece last May by UN's Food and Agriculture Organization, and spent several months studying the country's rehabilitation and development projects. A section of the report urges that Greece, with the guidance of UN, undertake flood control, drainage and irrigation projects to cost some $20,000,000 in the next five years.

Factories . . . .

Brazil—An interesting adaptation of concrete rigid frame elements to a new factory building for General Electric S.A., at Sao Paulo, Brazil, is shown in the photograph on this page. Consisting of six transverse bays of 66 ft., and seven longitudinal bays of 33 ft., the structure is framed with bents whose columns are of twin-leg design below the level of a crane rail. The height from the floor to the underside of the main girder of the bents is 34 ft. 6 in. The main girder is 19¾ in. wide, 80 in. deep at the haunches, and 71 in. at the center. Each of the twin-column legs is 23⅝ in. square.

The sawtooth roof framing is also of concrete, an element of interest being the 60 deg. inclination of the vertical members away from the face so that windows can be made continuous. The roof will be of precast concrete slabs with corrugated asbestos covering, and it is contemplated that the sun's rays, heating the airspace between the roofs will generate a moving layer of air that will keep the under-roof cool.

The natural lighting of the building was designed to provide uniform high quality illumination from the southern sky. In the north wall, at the left of the photograph, a row of windows is provided near the floor, while in the south wall there is a row of windows just above the top of the twin columns.

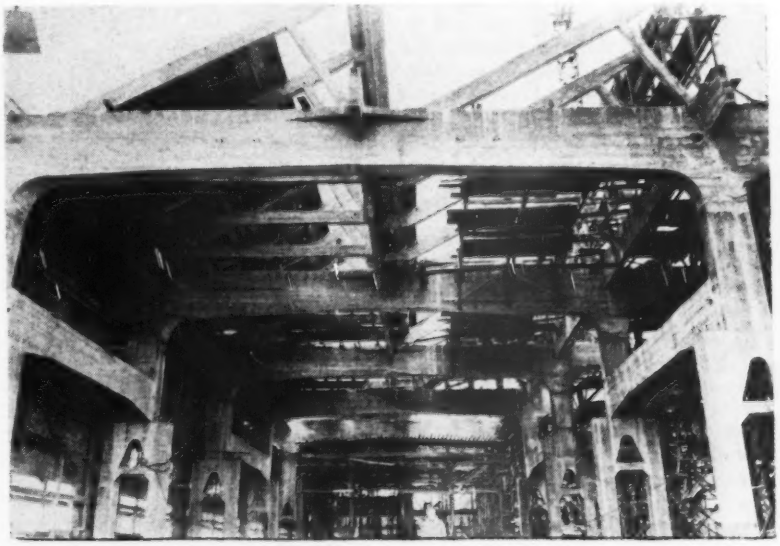
The method of design was based on the fact that the structure is a continuous frame, including rigid connections to the concrete pile foundations. The building is braced longitudinally against the forces caused by the starting and stopping of 30-ton cranes, by the inverted U-shaped girders between the columns in alternate bays. These girders and their adjacent columns are designed as portal frames, and the main building frames are designed to counteract the transverse trust of the cranes.

The building is being constructed by Companhia Constructora Pegado-Sousa, of Sao Paulo and Rio De Janeiro. Construction engineer is D. C. Campbell of General Electric, and design was prepared by Andrew Vogel, of International General Electric.

Dike Closed . . . .

China—The Chinese government's Central News Agency said last week that the great gap in the dikes of the Yellow River at Huayuankow has been closed, and that the river is now flowing in its pre-1938 course.

Chinese forces blasted the river dikes at Huayuankow in 1938 to thwart Japanese armies moving southward from Manchuria, and turned the river into a new course that flooded thousands of acres of fertile farmland. Last year (*ENR* Oct. 31, 1946, vol. p. 572) a joint government-communist-UNRRA project began to close the gap in the dikes and turn the river back to its old bed.



***Concrete Rigid Frame for Factory**—Basing their design on the fact that the structure itself is a continuous frame, including rigid connections to the concrete pile foundations, engineers building a new factory for General Electric, S. A. at Sao Paulo, Brazil, framed the structure with bents whose columns are of twin-leg design below the level of the crane rails. The sawtooth roof is also framed of concrete, with vertical members inclined 60 deg. away from the face so that windows can be made continuous.*

Greater responsibility for engineers seen in expanded highway programs

Mississippi Valley highway officials warned of impending highway needs—R. C. Keeling of Kansas elected new president.

The need for long-range planning at all levels of state highway construction held first attention at the 38th annual meeting of the Mississippi Valley Conference of State Highway Officials, at Chicago March 14-15. More than 200 engineers and officials representing 16 member states, the Public Roads Administration and county engineering organizations heard speakers urge the need for planning that will produce an integrated, serviceable, nation-wide road system, properly engineered and properly financed.

The group elected R. C. Keeling, Kansas state highway engineer, as president, and O. L. Kipp, assistant commissioner and chief engineer for the Minnesota highway bureau as secretary.

Speaking at the opening session, G. Donald Kennedy, vice-president of the Automotive Safety Foundation, told the group that highway engineers and administrators are facing a completely new situation in the fact that much of the nation's primary highway system will require reconstruction for increased capacity during the next decade.

"True economy to preserve this new investment," Mr. Kennedy said, "requires the application of our best engineering 'know-how' in planning and design, in the use of stage construction, and, most importantly, in provision of adequate right-of-way.

"Urban arteries must be treated as their traffic volume and as origin-destination studies indicate. Demands for more service to rural areas are increasing. Proper standards must be specified to assure lowest possible maintenance cost, and there is need for better evaluation of economic benefits created by county road systems.

"Increased unit costs for construction, maintenance, administration and engineering surely indicate that the road dollar must be stretched to the utmost. Moreover, to obtain better administration and engineering will require adequate compensation. In this connection, the AASHO is to be complimented on its current salary study."

Tolls are barriers

"In 14 state legislatures," warned Mr. Kennedy, "there now are pending proposals of one kind or another providing for the construction of toll highways. These will become barriers in our public-free road system. The public has paid — and willingly — special taxes in large amount to provide this great transportation system."

"There is considerable evidence that the much-needed long-range planning is now in progress. The Federal-Aid Highway Act of 1944 outlines the federal plan. California has completed a state-wide study, and Michigan is reported to be getting one under way. A dozen proposals for interim legislative study committees are being considered. In dozens of cities cooperative studies have been made with state and federal assistance.

"Finally, public support for the kind of program needed today can be obtained only through adequate dissemination of information—through the use of a tool we call public relations," concluded Mr. Kennedy.

Officers—O. L. Kipp (left) is new secretary, and R. C. Keeling (center) is new president of the Mississippi Valley Conference of State Highway Officials. E. L. Roettiger (right), retiring president, has just handed over his gavel.

Speaking on the development of the federal-aid secondary system, H. E. Hilts, deputy commissioner, Public Roads Administration, stressed the cooperative efforts of the states, counties and PRA, resulting in an increase of the secondary systems, established under terms of the Federal-Aid Highway Act of 1944, from 80,000 mi. on January 1, 1946, to 324,000 mi. on January 1, 1947. The latter figure exceeds by 90,000 mi. the length of the 25-year-old federal-aid primary system.

About two-thirds of the 1946 and 1947 fiscal year funds for secondary roads have been programmed, Mr. Hilts stated. Projects programmed to Feb. 1 totaled 23,675 mi., estimated to cost $384 million.

Describing cooperation by the counties in the program during 1946, he pointed out that of a total of 3,071 counties in the United States 900 have participated in engineering for secondary road projects. Surveys and plans are made by all 900 of these counties; 500 also prepare specifications and estimates.

Costs and methods

Results of bids on scattered federal aid projects of all classes since the first of the year indicate an increase of about 10 percent over 1946 prices, Mr. Hilts reported.

Construction work in 1946 on the secondary projects was performed almost everywhere by contract methods, with a few exceptions, he added. In North Dakota and Kansas, 80 percent and 20 percent, respectively, of secondary projects were constructed by county forces. Outside of these two states, there were 15 counties in six states carrying on construction with their own forces.

"To stimulate work on the secondary system, in view of the general price situation," he declared, "it may be desirable to encourage the construction of more federal-aid secondary projects by county forces. It is possible for counties which have the necessary equipment to do the grading, either at agreed unit prices or by their own forces at their own costs, and it is possible to use agreed unit prices in bridge, drainage and surfacing projects. By the use of stage construction it is felt that encouragement would be given the small contractors where the counties are not interested in doing any portion of the work themselves."

Average cost of secondary roads, exclusive of bridges, as reported by Mr. Hilts, has been about $13,800 per mile, with a wide variation in cost per mile from $2,300 to $103,800.

The secondary program is developing particularly well, Mr. Hilts pointed out, in those states where the state highway departments have established divisions charged with the responsibility of handling the program, maintaining close contact with the counties and informing them of details. Essentiality of determining a stable secondary system on which yearly programs can be projected, for the next six or nine years is now generally understood by the counties, he declared. In his opinion, cooperation among counties, states and PRA is now on a firm footing which should lead to a fairly well-rounded secondary system in 10 to 15 years.

In bringing the meeting up to date on the national outlook for highway con-

(Continued on following page)

Metal failure caused bleachers collapse

Collapse of portable bleachers in the fieldhouse of Purdue University between halves of a basketball game Feb. 24 resulted from breaking or failure of the foremost metal hook-and-stirrup connections on the sleepers near the central portion of the stand, according to a report of the investigating committee released by the university trustees March 12. The remaining foremost sleeper connections in this front line then failed successively, the report pointed out, allowing the structure to be thrust forward and downward by the load. This movement displaced the A-frames supporting the stringers, which then broke at several places as a result of bending and lateral displacement.

Physical tests of 15 undamaged typical sleeper connections, the report declared, showed that their capacity was not sufficient to withstand the force acting on the foremost line of these connections. In addition, the fractures of two broken metal hook-and-stirrup connections on adjacent sleepers in the region of the initial failure showed an oxidized condition, indicating that partial fracture had occurred at some time previous to the final failure.

President Frederick L. Hovde announced release of the report by the committee, made up of 15 members, 5 appointed by Governor Ralph F. Gates of Indiana and 10 by Allison E. Stuart, president of the board of trustees. (*ENR*, March 6, vol. p. 353). The bleachers contained 42 tiers of seats and were about 125 ft. long by 81 ft. deep, in horizontal dimension. At the basketball game, about 3,600 persons occupied the bleachers.

Highway officials

(*Continued from page 6*)

struction, Hal H. Hale, secretary of the American Association of State Highway Officials, called attention to the fact that technical progress has far outdistanced administrative progress in highway work over the last 25 years.

Increasing responsibilities offering a challenge to highway administrators, are evident in three major fields: Urban highway planning and construction; secondary road construction, and the threat of a substantial system of toll-highways in competition with state highway systems.

Planning for urban highway development is of paramount importance, warned Mr. Hale, as the pattern established for this work will fix the pattern by which cities must build for the next 50 years.

Ask bids on new link Detroit-to-Chicago road

The Wayne County Highway Commission has announced that bids will be opened this week for a bypass around Jackson, Mich.—the first step outside Wayne County on the Detroit-to-Chicago expressway.

Bids will open at the same time on two other projects in Wayne County: a 4.07-mi. strip of concrete pavement on North Line road from Middle Belt road west to Huron River drive, and a 7.7-mi. strip of bituminous concrete resurfacing on M-17 from Belleville to a point east of Middle Belt road.

Air entrainment

In the report of the meeting of the Association of Highway Officials of the North Atlantic States, (*ENR* March 6, vol. p. 352) L. E. Andrews of the Portland Cement Association was incorrectly quoted on methods of deteming air-entrainment of concrete. Mr. Andrews' statement comparing pressure and rolling methods of determining the volume of air entrained in concrete was:

"Both the pressure and rolling methods yield reliable results when applied to paving concrete. Time required to perform a test by the pressure method is about half that required for the rolling method, giving the pressure method preference in most cases. In the case of concrete made with aggregates of high and variable porosity, such as slag, the rolling method is, for the present, considered more practical."

Mr. Andrews is of the opinion that use of the rolling method is necessary only for aggregates that have very high absorption and varible specific gravity.

Comparative road costs announced in Nebraska

Wardner G. Scott, State Engineer for Nebraska, reports that bids received for state highway construction in that state are in line with those received in neighboring states.

The price of concrete paving in Nebraska is $2.69 per square yard as compared to $2.65 in Missouri, $2.60 in Kansas and $2.34 in Iowa. The $36.41 per cubic yard price of concrete for structures compares with $39.19 in Missouri; $33.40 in Kansas and $37.69 in Iowa. Twenty-four inch metal pipe is $2.70 per lineal foot in Nebraska, $3.45 in Missouri, $3.13 in Kansas and $2.65 in Iowa.

New highway financing announced in Ontario

A radical change in highway financing in Ontario was announced by the provincial treasurer in the annual budget presented to the legislature on March 11. When the dominion wartime tax of three cents per gallon on gasoline is removed at the end of this month the Ontario tax will be raised from eight cents to eleven cents a gallon. In return for this increase, however, the provincial government will then pay subsidies under certain conditions to cities, towns and villages to reimburse them, in part, for their expenditure on municipal highways.

"All cities in the province and towns and villages in Northern Ontario will receive a subsidy of fifty percent of their road expenditure" the budget message said, "provided the maximum subsidy payable shall not exceed one mill on the general assessment. Towns and villages in counties in southern Ontario will receive a subsidy of fifty percent of their road expenditure provided the maximum subsidy shall not exceed county road levy for the preceding year. County rebates to towns and villages will be discontinued. The effect of this will be to make more money available to counties for expenditures in county roads and this will be further augmented by an equal amount payable as subsidy.

The proposed financial arrangement is estimated to cost the province about $2,800,000.

Delaware River bridge construction approved

Construction of the Delaware River Bridge at Wilmington, Del., has been approved by Secretary of War Robert P. Patterson and Secretary of the Navy James Forrestal, it was announced March 17. Word of the approval was received by Frank V. duPont, chairman of the Deleware State Highway Commission, and Lieut.-Gen. Eugene Reybold, head of the Delaware River Crossing Division of the State Highway Department.

With the permit to build the span approved, the only remaining authorization required is the Delaware Legislature's approval for increasing the bond issue to finance the construction cost.

General Reybold pointed out that 1,500 ft. of the bridge's main span must be made 9 ft. higher than originally planned, and also that construction costs have gone up.

HIGHLIGHTS OF MUNICIPAL DEVELOPMENTS

A summary of current activities in city engineering and construction

Indianapolis, Detroit, other cities plan water system improvements—Oklahoma City plans $4 million sewerage system work—Boston seizes land for parking garages—Omaha plans $2.5 million memorial auditorium—Other civic news

Plans for improvements to water supply systems—projects in many cases deferred during the war period but now needed to accommodate fast-growing populations—were highlights of the municipal field last week.

The privately-owned water company, at Indianapolis, Ind., for example, announced it would spend $1,500,000 during this year for a pumping and purification plant at Fall Creek, and for new water mains. In an annual report filed with the state Public Service Commission, the company reported that it gained more than 1,400 customers during 1946, and pumped nearly a billion gallons more water than in 1945.

Bellville, Ill., thought its present water supply would be doubled, when the East St. Louis and Interurban Water Co. completes contemplated improvements, including the construction of a 5,000,000 gal. reservoir, installation of new pumping equipment, and placing of some 20 miles of new main.

At Detroit, Mich., the city council appointed a 3-member committee of civil engineers to report on the city's water supply system and sewage disposal. Water and sewer department engineers have been unable to agree on plans for handling the city's Fox Creek drainage district and location of a new intake plant. Councilmen appropriated $50,000 to finance the survey. Committeemen include Malcolm Pirnie, of New York City; Samuel Greeley, Chicago, and William Storrie, of Toronto, Canada. Results of their survey and recommendations are expected to affect the expenditure of some $37,000,000.

Van Wert, Ohio, city councilmen considered the recommendation of an engineering firm calling for construction of a new waterworks at a cost of $625,000. The city is faced with the gradual drying up of wells on which it now depends, and engineers suggested the development of Town Creek as a source.

Baltimore, Md., received bids on a seven-mile water tunnel to connect Lake Montebello and the north branch of the Patapsco River, but found the bids ran more than $3,000,000 over original city estimates.

And at Bartlesville, Okla., city officials said they would ask bids soon on construction of a pumping station and water treatment plant as first phase of a $1,500,000 water system improvement program.

Sewage disposal plans

Plans and specifications for the long-delayed $4,000,000 sewage disposal plants of Oklahoma City, Okla., were ordered prepared last week. City Manager William Gill, Jr., said that State Health Department officials had approved plans drawn by the Benham Engineering Co., which holds contracts for engineering of the program, and added that plans must still be completed for lateral lines connecting with the main sanitary sewer lines.

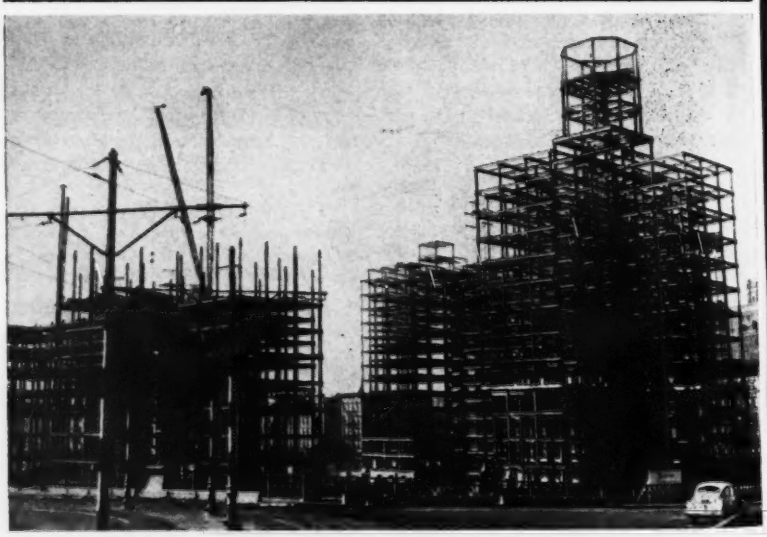
Salt Lake County, Utah's most populous area, awaited a report from a three-man engineering committee studying a $2,500,000 sewage disposal project.

The City of Bedford, Ind., announced it would disregard a mandate from the state Stream Pollution Control Board, because present high construction costs would make a new sewage system and disposal plant "prohibitively high." Mayor Paul Lostutter said that cost of the new installation would put the city in debt by more than $1,000,000.

Baltimore, Md., county officials rejected all bids for installation of storm sewers in part of Loch Raven Village because two items of the lowest bidder's offer were "unbalanced". Uncertainty in the bids was caused by lack of complete information as to the amount of rock that may have to be moved for the work.

Hartford parking garage

Plans for a 1,000-car municipal parking garage that would also provide space for stores have been submitted to the city council of Hartford, Conn., by R. J. Ross, city engineer. The $1,000,000 building, to be located in the business area, will face on two streets and provide space for 12 stores on each street, and a system of ramps leading to three garage floors and a roof for public parking. The building's base-



***New York Housing Advances**—Construction of seven 13-story buildings known as the Riverton housing project is now going ahead speedily in the area running from East 135th street to East 138th street, and from Fifth Avenue to the Harlem River in Manhattan—a crowded section of Harlem. The project, being built by the Metropolitan Life Insurance Co. in conjunction with the city of New York, will provide 1232 apartments.*

ment will provide parking space for employees. Stores on the street level are proposed to harmonize the building with surrounding structures.

Boston takes action

In its first concrete step toward solving its business-area parking snarl, Boston, Mass., real estate commissioners last week announced plans to seize 14 downtown buildings to provide off-street parking for nearly 2,000 cars. The buildings selected have a total assessed valuation of $1,228,000.

The sites cleared by this action will provide three integrated parking areas—one each for the business district, the financial section and the "wholesale" district of the city. No announcement was made as to type of structures to be erected on the areas.

Auditorium at Omaha

Members of the Auditorium Commission for Omaha, Neb., have approved appointment of the Leo A. Daly Co., Omaha, as architect for a $2,500,000 memorial auditorium planned for the city. The contract must still be ratified by the city council.

The auditorium, long projected by civic boosters, will give the city expanded facilities for conventions of state and national organizations and other large gatherings.

Can't sell courthouse

Winnebago County (Rockford) Ill., can't sell its courthouse and courthouse square, preparatory to building a new structure to house county offices, the state's attorney general said in an opinion last week.

The old courthouse, which commissioners hope to replace, stands on land "conveyed for public use", and suit must be brought through the courts to quiet the title before the land can be sold for use for other purposes, the opinion said. Plans for securing federal aid in planning a new courthouse have been held up pending decision on disposal of the present site.

Philadelphia subway work

Philadelphia, Pa., moved ahead with its multi-million-dollar plan for extension of the Market St. subway with the razing of buildings on the new right of way. Lawrence Costello, acting transit director, said plans for the extension—from 32nd to 36th streets—are now completed, and removal of the buildings will permit work to start in about 60 days. Bids for initial construction work will be called in May.

UTILITY CONNECTIONS REQUIRED BEFORE STREET REPAVING

By state action, the Chattanooga, Tenn., city charter recently was amended to give the city commission authority to require property owners to make utility connections before streets are repaved.

Under the amendment, the city has authority to force property owners to make water, gas, sewer and electric connections before any street paving project is started. If owners refuse, the city may make the connections and charge the cost to the owner with a 10 percent penalty.

Harbor for Savannah

Work on the improvement of the harbor at Savannah, Ga., will get under way in the near future, Army engineers have announced, after a $1,000,000 appropriation had been approved for the work. Improvement will include dredging the river channel through a sandbar off Tybee Island, and deepening the channel upriver.

Airport for Danbury

A special town meeting at Danbury, Conn., authorized a $50,000 bond issue to be added to a $148,000 federal grant for improving the municipal airport, including the purchase of more than seven acres of land needed for expansion of the facility.

Toll receipts for city

Louisville, Ky., will spend an estimated $274,000 surplus revenue from the city-owned Municipal Bridge, on street improvements and some needed city construction work, as result of a court decision last week.

A state court decided that the city could use the money for these purposes, after obligations are paid off.

***Parking Solution**—A parking deck to accommodate 500 cars has been proposed by the Holyoke, Mass., Planning Board for construction over the yards of the Holyoke and Westfield Railroad—a city-owned line operated under lease by the New Haven Railroad. The deck, to cost $695,000, would be of steel and concrete, 19½ ft. above the yard's ground level, with an area of 128,700 sq. ft. Access would be gained by four ramps leading to streets on higher ground at top of upper picture. R. R. Campbell, Holyoke engineer, drew plans, and T. A. Kirley, architect, made preliminary drawings.*

Railway engineers seek new recruits

(*Continued from page one*)

R. B. Peck, research associate professor at the University of Illinois, who is in charge of the cooperative research into roadway design, said that their studies had clearly demonstrated that drainage is not the answer to soft track when there is plastic clay under the ballast. This is due to the fact that the amount of moisture required to produce an undesirable amount of slurry is so small that it cannot be removed by underdrains. Much of the moisture needed to create this condition is of a capillary nature.

This explains why grouting of the ballast in soft track is so generally successful, Prof. Peck said. Even a thin layer of grout between the stone and plastic clay will exclude the water needed to create a slurry and start a movement of the ballast.

The Committee on Maintenance of Way Equipment included in its report a statement of the equipment required for a typical track grouting operation. The savings from such operations often offset the cost in one year.

Fewer rail failures

Statistics of rail failures compiled by the Rail Committee show clearly the great advance toward elimination of rail failures due to transverse fissures that has resulted from widespread adoption of controlled cooling of rails. Only 50 transverse fissure failures have been reported in all control-cooled rails laid up to Dec. 31, 1945. The first of such rails were laid in 1935 and the amount now in service is around 45,000 miles.

During the year the AREA adopted three new rail sections, 115 lb., 132 lb. and 133 lb. The principal changes from earlier sections of closely similar weights are small additions to the fillet areas to reduce stresses to below those tending to produce fatigue cracks.

The rail committee also reported an extensive research to reduce "shelling" and to eliminate the development of surface roughness. Research for the improvement of joint bars also is being continued.

Construction contracts

A revised form of construction contract for inclusion in the manual was approved as was a form for a cost-plus percentage construction contract. These are to bring the associations contract forms into line with current insurance requirements and the newer laws affecting contracts. A form of construction contract for minor projects also was approved.

The Masonary Committee submitted for the manual revised "Specifications for Concrete and Reinforced Concrete Railroad Bridges and Other Structures". Included are allowable working stresses, design of reinforced concrete beams and columns, frames, one-way and two-way slabs, flat slabs and footings. The same committee submitted for review a new specification for the design of concrete transmission poles. Its report also carried a long statement on air-entrained concrete.

A much shorter statement on the same subject that was included in a report on recently developed building materials prepared by the Committee on Buildings was withdrawn by that committee because of errors found in it. This committee's report on new materials also covered corrugated glass, glass block, insulating glass units, silicone resin paints, enameled steel tile, vinyl resin floor tile, structural aluminum, precast concrete shapes, asbestos-cement roofing and siding, and cement-base paints.

Cathodic protection for tanks

Very favorable comment on the advantages of cathodic protection for water tanks was made by the Committee on Water Service and Sanitation. The committee said that such protection costs about as much as one cleaning and painting of a water tank and if properly installed and maintained is more effective than painting. Included in the report was a description of two typical cathodic installations.

Field tests of electrolitic corrosion of steel in concrete being conducted by the AAR have shown that asphaltic waterproofing is quite effective in preventing such corrosion, that the thickness of concrete or the use of admixtures has little effect and that concrete surrounding the steel in test specimens had deteriorated on account of sulfate attack. Studies, therefore, are being made on the use of sulfate-resisting cements and on the effect of using emulsified asphalt in the concrete, the committee reported.

New officers elected

Armstrong Chinn, president of the Terminal Railroad association of St. Louis, was elected president of the AREA to succeed J. B. Akers. C. H. Mottier, vice-president and chief engineer of the Illinois Central System was advanced to first vice-president and F. S. Schwinn, assistant chief engineer, Missouri Pacific Lines, was elected second vice-president. New directors are T. A. Blair, assistant chief engineer, A. T. & S. F. Ry., W. D. Simpson, chief engineer, Seaboard Air Line R. R., and H. S. Loeffler, assistant chief engineer, Great Northern Ry.

At the opening session, J. B. Akers stated that the association would be operating in the red by the end of this year, hence an increase in dues is indicated. W. S. Lacher, secretary, reported that the Board of Direction is considering a new method for publishing the association's bulletins, especially those relating to research being conducted by the organization.

Honorary membership in the association was conferred on D. J. Brumley, retired chief engineer of the Chicago Terminal Improvements, Illinois Central Railway.

After a lapse of five years, the National Railway Appliances Association put on an exhibit of railway equipment of interest to the AREA members, returning to its old stand at the Colliseum. More than 100 companies dealing in railway supplies were represented in the exhibits.

Begin pollution study of Detroit River

An enlarged study of pollution in Canadian boundary waters between Michigan and Ontario in Lake St. Clair and the Detroit River has begun, coincident with the opening of lake navigation.

A federal government staff of 15 engineers, chemists, and bacteriologists has been working under the direction of the International Joint Commission. Cooperating with the United States Public Health Service are the Michigan Control Commission and the health departments of Detroit and seven other U. S. cities.

Educational film on roads available for public

A sound and color motion picture designed to educate the general public in the need for maintaining and building superior highway systems has recently been released by the Caterpillar Tractor Co., of Peoria, Ill.

The close association of the national highway system with the development and maintenance of trade is the theme of the motion picture.

The film was produced by the Calvin Co., of Kansas City, Mo. Organizations or groups interested in viewing the picture may contact the Caterpillar advertising department, at Peoria.

Congress considers new housing bills as Senate, House advance legislation

New Wagner-Ellender-Taft bill introduced in Senate—House measure would take U. S. out of housing picture

Diametrically opposite bills—one that would affirm the federal government's position as dominant factor in the housing field, and the other aimed at taking the government out of housing—were introduced in the national Senate and House, respectively, last week.

Numerous other measures pertaining to the construction industry also have been introduced in both houses recently, supplementing more than 50 bills placed before the Congress during its first few days of meetings (*ENR* Feb. 27, vol. p. 336).

The Senate housing bill (S. 866) is jointly sponsored by Senators Wagner, Taft and Ellender, who were authors of a similar measure which passed the Senate last year, but failed in the House. Their new bill would make the National Housing Agency a permanent organization and would provide nearly $38,000,000 of federal housing aid the first year—including $4,000,000 for slum clearance, $26,400,000 for low-rent public housing, $5,000,000 for rural non-farm homes, and $2,500,000 for farm-home construction. At the end of four years the federal assistance would be increased to $150,000,000 annually. Opponents of the bill claim that total cost of the program to the U. S. would be $6 billion.

Hearings have been scheduled to get the new bill out of committee early in April; only four days of hearings split evenly between advocates and opposition are planned.

Takes U. S. out of housing

Another bill (H. R. 2549) aimed to get the federal government out of the housing picture has been introduced by Rep. Wolcott of Michigan, chairman of the Banking Committee of the House, where most opposition to government housing lies. The Wolcott bill would repeal most of the federal controls on non-housing construction and the aids to housing work as set forth in the Veterans Emergency Housing Act of 1946. This bill would end the guaranteed market for prefabricated housing, the subsidy program for increasing the output of building materials, and the permit system now effective for housing and several types of non-housing.

Several other bills recently introduced also pertain to housing. These include: H. R. 2025, another general housing bill promoting home-building, urban redevelopment and slum clearance; S. 701, providing moderate rental housing for veterans by amending the U. S. Housing Act of 1937; and S. 817, permitting temporary housing transferred by the National Housing Administrator to educational institutions to be permanently retained by these institutions.

A House resolution (H. J. Res. 142) would exempt certain contracts from limitations fixed by the U. S. Housing Act of 1937, thereby allowing 153 projects totaling 17,900 units to be started. The measure would also remove the $1,000-per-room cost ceiling in cities under 500,000 population and the $1,250 ceiling for larger cities.

Building officials group adopts basic code

At the first meeting of the executives of the newly-formed Building Officials Foundation (*ENR* Oct. 24 '46—vol. p. 556) held in New York City, recently Bernard S. Savage, formerly of the Board of Standards and Appeals, New York, announced completion of a tentative draft of the basic building code which the group is sponsoring as the standard for building practices in American cities.

This is the first serious cooperative effort on the part of industry and municipal building officials to eliminate the delays and waste incident to the introduction of improved methods and materials in various cities. It also will provide smaller cities with authoritative reports on new products.

Andrew J. Eken, head of Starrett Brothers & Eken, will serve as chairman of the board of the Building Officials Foundation. Other members of the Board are H. L. Andrews of the General Electric Co., Joseph H. Carter of the Pittsburgh Steel Co., Bror Dahlberg of the Celotex Corp.; J. R. Fink of the National Steel Co.; Thomas S. Holden of the F. W. Dodge Corp.; Roy A. Hunt of the Aluminum Co. of America; J. C. Ingersoll of the Ingersoll Steel Co.; C. Louis Meyer of the Ceco Steel Products Corp.; Leroy A. Petersen of the Otis Elevator Co.; H. H. Robertson of the H. H. Robertson Co.; George Skakel of the Great Lakes Carbon Corp.; J. H. Thornley of the Western Foundation Co. and Loring Washburn of the S. H. Pomeroy Co.

State and municipal building executives are also on the board.

Building research body created for Canada

A division of building research was instituted recently by the National Research Council of Canada, which has extensive laboratories at Ottawa, Chalk River, Ont. and in the west of Canada.

The new division will work closely with the Central Mortgage and Housing Corp. to provide scientific data for an adequate program in all fields of construction, including building materials, types of construction, layout and other essential features.

The first director of the division is Robert F. Legget, at present Associate Professor of Civil Engineering at the University of Toronto.

Professor Legget was graduated in civil engineering from the University of Liverpool in 1925 and spent four years on heavy engineering work with consulting engineers in Great Britain before going to Canada in 1929. He then joined the construction division of the Power Corporation of Canada and was engaged on water power and foundation engineering until joining the staff of Queen's University, Kingston, Ont., in 1936. He went to the University of Toronto in 1938.

Building officials report on hotel fire safeguards

Recommendations designed to minimize loss of life in hotel fires were made public March 22 by the executive committee of the Building Officials Conference of America, Inc., following a review of findings and conclusions on the Winecoff Hotel fire in Atlanta, Ga., last December.

The conference recommended, among other things, the elimination or sealing of transoms in hotel guest rooms; the protection of all floors by supervised watchmen's services, in lieu of adequate fire protection equipment provided with automatic transmission of alarm to the fire department; and the installation of fire vent flues and ducts.

MAJOR MEETINGS

National Rivers and Harbors Congress, 37th convention, U. S. Chamber of Commerce Bldg., Washington, D. C., May 2-3.

United States-Mexico Border Public Health Association, annual meeting, San Diego, Calif., May 6-8.

Society for Experimental Stress Analysis, annual meeting, Stevens Hotel, Chicago, Ill., May 15-17.

American Society of Civil Engineers, spring meeting, Westward Ho Hotel, Phoenix, Ariz., April 23-25.

MEN AND JOBS

Finch Van Slyke has been appointed Pierce County engineer at Tacoma, Wash., to fill the post vacated by **Lester M. Corey.** He has been connected with the department for 24 years, most recently as field engineer.

Commodore L. N. Moeller has been appointed superintending civil engineer of the 13th naval district covering the Pacific Coast. He will direct construction activities from San Francisco. Commodore Moeller succeeds **Rear Admr. Carl A. Trexel,** who moves from Seattle to San Francisco to take over the post of head of the Pacific division of the Navy's Bureau of Yards & Docks.

Louis D. Kelsey, Sr., city manager of Milwaukie, Ore., has resigned to take a similar post at Fairbanks, Alaska.

Charles L. Badger, Loves Park, Ill., a graduate of the University of Illinois in civil engineering, became Rockford Township highway commissioner Feb. 18 to fill the unexpired term of **Arnold L. Lundgren,** Rockford, who resigned to devote full time to his private engineering practice. Badger served on three continents in World War II.

Frederick H. Dechant, Philadelphia civil and hydraulic engineer, has been chosen to direct Pennsylvania's campaign to clean up the Schuylkill River. Governor Duff announced his appointment as advisory engineer in the Department of Forests and Waters. From 1924 until 1941, Mr. Dechant operated the firm of William H. Dechant and Sons, consulting engineers, of Reading and Philadelphia. He has been interested in Schuylkill River improvement for many years. As long ago as in 1935-36 he served as an adviser in a Schuylkill River survey. He also served the Navy as a consultant in civil engineering and hydraulic problems in the 1st, 3d, 4th, 5th, and 6th Naval Districts.

Charles W. Reilly has returned to civilian status as head of the Syracuse, N. Y., sub-office, Buffalo, District, Corps of Engineers. His office will be in the Chimes Building, Syracuse. As lieutenant colonel, he served four years with the Corps of Engineers in Alaska and the Yukon. He assisted in the construction of the Alaskan Highway and the Canol project. Before entering service, Mr. Reilly worked 19 years with the U. S. Engineers.

Each of the six Alabama State Highway Department superintendents has been transferred to a different post, **Earl U. Richard,** from Decatur to Birmingham; **Grady M. Singleton,** from Birmingham to Alexander City; **J. F. Vaugh,** from Alexander City to Tuscaloosa; **C. D. Propst,** from Tuscaloosa to Union Springs; **F. D. Hines,** from Union Springs to Grove Hill; and **W. P. Coleman** from Grove Hill to Decatur.

Ike Ashburn has been named executive vice-president of the Texan Good Roads Association. He succeeds Chas. E. Simons. He served in the same capacity when the association was organized 14 years ago. He was formerly commandant of Texas A&M College and spent more than 14 years in various capacities on the A&M staff.

Brig. Gen. James Creel Marshall is now on the engineering staff of the M. W. Kellogg Co. of Jersey City, N. J., and New York, N. Y. Foremost among General Marshall's more recent Army activities was his service on the atom bomb project. In June, 1942, he was directed to form the organization which in August of that year became the Manhattan Engineering District, charged with the development of the atom bomb. A year and a half later he was on duty with troops in Australia, New Guinea and the Philippines. During the latter half of 1945 he commanded the Boston Port of Embarkation and in 1946 was made president of the engineer board for the Corps of Engineers, at Ft. Belvoir, Md. Among his activities before the war was his work as area engineer at Albany, N. Y., in charge of the $27,000,000 improvement project on the N. Y. State Barge Canal in 1935.

Col. Edwin P. Lock, Corps of Engineers, one time R. O. T. C. instructor at the University of Tennessee, Knoxville, has been ordered to duty in the Memphis Engineer District. Later in

A. A. Becker, resident engineer for the Armstrong Cork Co. (left); Roy A. Moore, superintendent for R. A. Bowen Co.; N. F. Bryan, superintendent of Bethlehem Steel Co., and Eugene Boeke, superintendent of Beers Construction Co., study blueprints for Armstrong's new plant, now under construction near Macon, Ga.

Completing a year's training course in U. S. engineering practices, under sponsorship of the American Road Builders' Association and the U. S. Department of State, is this group of Latin-American engineers. The engineers have been assigned to various state highway departments and the engineering staffs of equipment manufacturers to observe advanced practice at close range.

the spring he is expected to replace **Col. Bartley M. Harloe** as district engineer. The latter has been alerted for foreign service and probably will be assigned to Hawaii.

Recently **George Borgman** and **Charles Hughes** started work with Warren and Van Praag, Inc., Decatur, Ill., consulting engineers, as field engineer and sanitary engineer, respectively.

Lansing G. Simmons has been appointed chief mathematician in the division of geodesy, U. S. Coast and Geodetic Survey. He is a civil engineering graduate of the University of Maryland and joined the Survey in 1923. He has been geodetic engineer to the Principal Geodetic Engineer from 1931 to 1947.

Eugene Baughman, an engineer in the office of the St. Louis, Mo., County Planning Commission, has been appointed executive secretary of the commission.

Joseph E. Breen, engineer in charge of technical information services for the Canada Cement Co. Limited, in the Toronto, Ont., office, has been appointed assistant general manager, with headquarters in Montreal. He is a graduate in civil engineering of the University of Toronto.

R. L. Parsons, Moncton, N. B., a civil engineering graduate of the Nova Scotia Technical College, Halifax, is taking postgraduate work at the Massachusetts Institute of Technology leading to a master of science degree in town planning.

James D. Quinn, of New Castle, Del., has left for Rio de Janeiro, where he will be associated with the Duperial Co. in an engineering capacity for the DuPont Co. In Brazil he will be assistant field project manager for the DuPont Co. construction and will be associated with **William H. Kiler,** formerly of Wilmington, Del.

Lester M. Corey has resigned as Pierce County engineer at Tacoma, Wash., but will continue with the department as field engineer. He has been with the department for 24 years, having become county engineer in 1934.

James R. Palmer has arrived in Rock Island, Ill., from Dixon, Ill., to assume his new duties as Rock Island city engineer, director of public works, and traffic safety engineer. He replaced **William Gallagher,** resigned.

In the Pennsylvania State Department of Highways, **W. E. Bailey,** district engineer at Upper Darby, has moved to Hollidaysburg, succeeding **J. Paul Ambler,** who has been transferred to Pittsburgh.

J. G. Gibbs, Waynesville, N. C., a chief of survey party in the tenth division of the N. C. State Highway & Public Works Commission, for the past eleven years has replaced Ivan Hardesty as senior right-of-way engineer at Raleigh, N. C. Hardesty is now located as senior right-of-way engineer with the second division, with headquarters at Greenville, N. C.

J. M. Nagle, former city manager of Houston, Tex., has been made public works director. He succeeds John G. Turney, resigned.

J. A. Nicholson (left) confers with James W. Macdonald (center) president, Macdonald Engineering Co. of Chicago, and Henry E. Christian, superintendent, on construction of a new grain elevator at Toledo, Ohio. The Macdonald firm is both designer and builder of the structure.

Dwight S. Jones of the Fowler-Jones Construction Co., and H. M. Lilly Jr., resident engineer for the Duplan Corp., pose before wall for a new nylon throwing plant being built for Duplan at Winston-Salem, N. C. The wall has concrete block inner facing, rigid block insulation and will have an exterior facing of aluminum.

T. L. Walton (left) bridge inspector for the South Carolina State Highway Department, J. V. Dunbar (right) resident engineer for the department, and G. H. McMurty, superintendent for the Nashville Bridge Co., hold a conference on construction of a new bridge being built to carry traffic on Route 34 across the Pee Dee River in South Carolina.

Rear Adm. D. B. Beary, commandant, 12th Naval District, poses with F. W. Crocker (left) of Oakland, Calif., and E. P. Davenport, of Palo Alto, who were awarded Certificates of Merit for their work in salvaging naval vessels after the Japanese attack on Pearl Harbor. Mr. Crocker was chief engineer, and Mr. Davenport manager during the operations.

Morton O. Withey, (left) dean of engineering at the University of Wisconsin, receives congratulations from his son, Norman H. Withey, director of research for the Alpha Portland Cement Co., on the winning of the Henry C. Turner medal of the American Concrete Institute. The younger Withey is a holder of the institute's Mason Medal.

ENGINEERING SCHOOL NEWS

Tuition fees to be raised at Rennselaer Polytechnic Institute— Lumber study at New Hampshire — Women civil engineers

President Livingston W. Houston of Rensselaer Polytechnic Institute has announced that, beginning next September, the institute's present tuition rate of $500 a year will be increased to $600. He said the rise was necessary because maintenance costs had increased by 70 per cent since 1941 and because "we must be in a position o raise faculty salaries to meet competition from industry."

In addition to the much higher operating costs, he pointed out, R. P. I.'s income from endowment funds had decreased because of lower interest rates. At the same time increase of more than 250 per cent in student enrollment had further decreased endowment income per student.

"Nearly every college in the country is faced with a similar financial problem and a number of large universities have also announced tuition increases," he stated. "Tuition for next year in eleven leading privately endowed schools of science and engineering will range from $500 to $700."

President Houston said, however, that no student would be forced to leave because of the increase. Deferred tuition notes and loans would be granted to those unable to meet the increase and the number of scholarships available to undergraduates would be increased.

"According to most authorities," he concluded, "costs have reached a peak. Whenever costs decline enough to warrant it, our tuition rates will be adjusted downward."

The office of the dean of students at R. P. I., reports that in March, 1946, the institute had 176 civil engineering students; in September, 1946, the number was 313; and in March, 1947, it was 329. The ratio of civil engineering enrollment to the total, however, was nine per cent in each case.

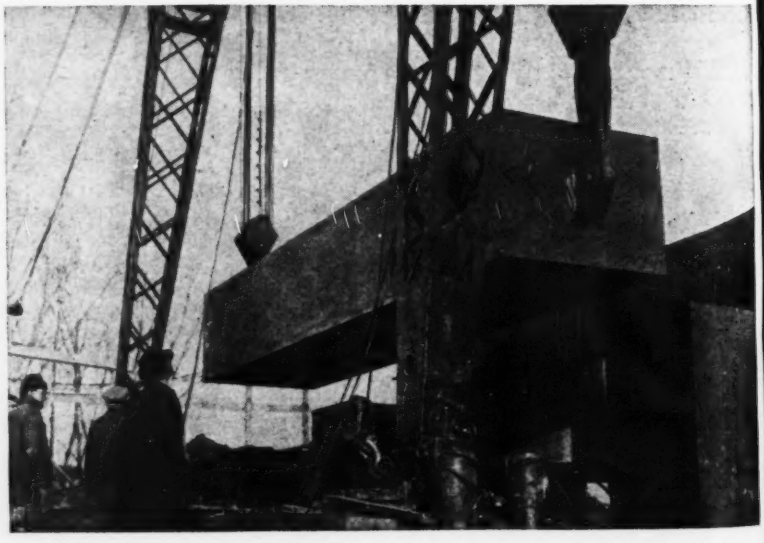
The University of New Hampshire engineering department is going in for a study of the lumber and forestry industry. A former Navy building on a Boston Harbor island has been moved to the university campus and will be used for laboratories, lecture rooms, and machinery for the practical study of preparing lumber for use.

That peak enrollment in engineering schools will not be reached for several years is the opinion of F. Lynn Cason, head of personnel services for the schools of engineering and science at Purdue University, Lafayette, Ind., who concludes, however, that job opportunities for engineers will reach the saturation point with the graduation of the 1948 class of engineers. He says that Purdue now has the largest engineering school in the world, with nearly 7,000 engineering students in a campus enrollment of 11,500, and nearly 1,000 additional freshmen engineers who are taking their first year's work in extension centers at Indianapolis, Columbus, Fort Wayne, Elkhart, East Chicago, Gary, Hammond, Laporte, and Michigan City, Ind.

James Murray Webb, designing and consulting engineer, has been named research associate and associate professor in the University of North Carolina Division of Regional Planning at Chapel Hill, N. C. Paul D. Haney, director and chief engineer of the division of sanitation of the Kansas State Board of Health, and assistant professor of engineering at the University of Kansas for the last five years, has been named associate professor of sanitary engineering at the university's School of Public Health.

The department of civil engineering, University of Illinois, is holding three conferences and short courses for various types of civil engineering work. The highway engineers conference was held in February under direction of Prof. C. C. Wiley, head of highway and railroad engineering. The course was given especially for county superintendents of highways, city engineers and state highway engineers. A short course for water works operators will be offered March 24-28 and a course for sewage works operators will be given March 30 through April 14.

There appears to be a definite increase in the number of women studying civil engineering, judging by reports from engineering schools in various parts of the country. New York University has eleven undergraduate women enrolled in its college of engineering. Last year the Cooper Union School of Engineering graduated four young women. This year eleven women are enrolled, Margaret C. Bitner, of Riverside, Ill., is the first woman to earn a bachelor's degree in civil engineering at Pennsylvania State College in 54 years. One other woman was graduated in civil engineering at that college in 1893. Ten women are registered in engineering at the University of Arizona. This trend, according to Alice C. Goff in "Women Can Be Engineers" (*ENR* Nov. 14, 1946, vol. p. 669) is due to the large number of young women who did sub-professional work during the war and found it attractive.



***For Atom Smashing**—The mast and boom of a heavily-constructed guy derrick serve as gin poles for erection of a 150-ton section of the magnet of a super cyclotron at the University of Rochester (N. Y.). Made for smashing atoms in the U. S. Navy's radiation program, each of the 150-ton solid steel forgings of the cyclotron was cast from a full heat of open hearth steel.*

PERSPECTIVE....

Planning Industrial Mobilization

A peacetime production board—a civilian agency that would prepare for possible wartime mobilization of industry—is hidden within the Army-Navy merger legislation that President Truman sent to Congress.

Industrial mobilization planning has always been a job for the military, in peacetime. But, when war comes, civilians take over the job and most of the military's careful plans are pigeonholed. At present, industrial mobilization is the responsibility of the Joint Army-Navy Munitions Board, which comprises members of the two services under a civilian chairman.

The President's new plan would set up a civilian National Security and Resources Board, reporting directly to the President. It would take over the work of coordinating military, industrial and civilian activity. The munitions board would be restricted to planning for the "military phases" of industrial mobilization. In wartime, presumably, NSRB would be geared to expand into the roles filled in the last war by WPB, OPA and others.

Immediate responsibility of NSRB, under terms of the proposed legislation, would be policy-setting on the program for stockpiling critical materials—a job now handled by the munitions board.

The organization would also be charged with advising the President on "strategic relocation of industries, services, government and economic activities whose continuous operation is essential to the nation's security." The huge job of decentralizing industry into a distribution less vulnerable to atomic war is one which the munitions board has on its agenda for consideration in three or four years.

Under Mr. Truman's proposal, the head of NSRB would be a Presidential appointee, reporting directly to the White House. Other members would be "heads or representatives" of the executive departments and independent agencies.

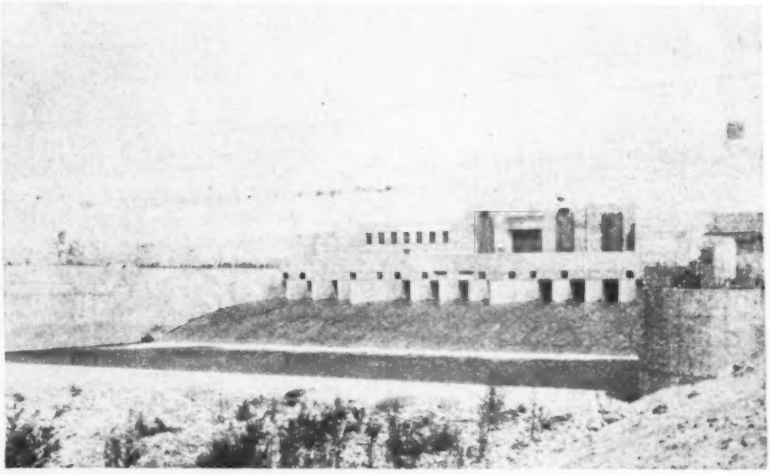
California's Santa Fe Dam completed after war halt

Construction of the Santa Fe Dam on the San Gabriel River some 30 miles northeast of Los Angeles, which was stopped in 1943 by the press of wartime work, has been completed under a contract let last year. With the finishing of the dam proper, all that remains to be done on the $14,000,000 flood control project is the installation of outlet gates and some upstream channel improvements. This dam is notable for the methods used in handling material for the 12,000,000-cu.yd. earth- and rockfill and was previously described in *ENR* Sept. 24, 1942, vol. p. 434.

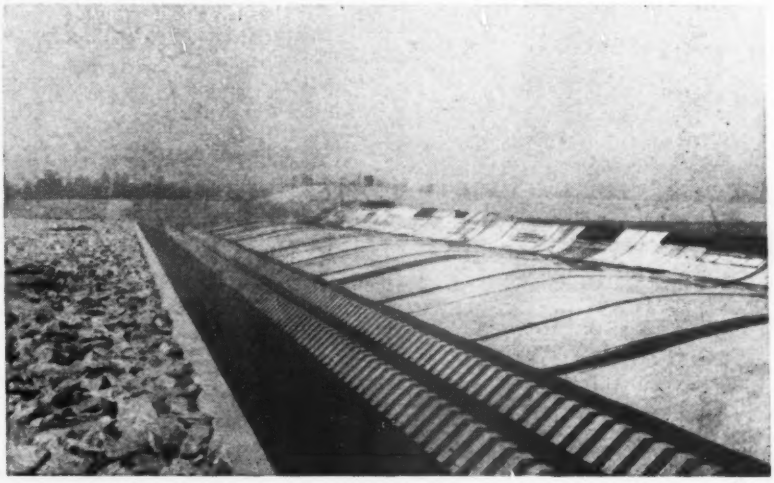
Started in 1941, the dam was almost completed when work was canceled in 1943. The original $8,837,199.50 contract was held by a joint venture of Morrison-Knudson Co., Winston Bros. Co., J. F. Shea Co., and Ford J. Twaits Co. The amount of work necessary to complete the project can be seen by a comparison of the original contract at 1941 prices with the 1946 contract which was awarded to Guerin Bros., Los Angeles, for $483,598.

The recent work consisted mainly of completing the spillway structure and placing the final layers of fill. Cobbles 6 in. and larger were placed on both faces of the fill to protect against erosion.

The project is part of the flood control program of the southern California area. It will serve to protect the San Gabriel River flood plain by retaining peak flows. Such retained flow will be released at a rate calculated to replenish the underground water storage. Design and construction of the dam was under the direction of the Los Angeles District, Corps of Engineers.



A general view of the downstream face of Santa Fe Dam shows the outlet structure and control works. Sixteen outlet conduits extend under the dam and terminate in these buildings. (Bottom) The 1,200-ft. spillway required 20,100 cu. yd. of concrete.



OBITUARY

Calvin Monroe Miller, 81, civil engineer and pioneer road builder in North Carolina, died at Winston-Salem, N. C., March 12. He formerly was city engineer at Salisbury, N. C., county engineer and surveyor of Rowan County, N. C., highway engineer of Wake County, N. C., and highway engineer of Forsyth County, N. C. Since 1931 he had been engaged in private engineering practice at Winston-Salem.

Harry Thompson, civil engineer of Edmonds, Wash., died there March 5. He had lived at Edmonds for 43 years and served for seven years as King County engineer.

Jack Wilson, 59, manager of the Seattle, Wash., branch of the John A. Roebling's Sons Co., died March 6 at Seattle, where he had lived since 1905. He had been with Roebling's since 1920.

John Hardin Thomas, 80, retired U. S. government engineer, died at Louisville, Ky., March 14. He had a part in the construction of several important dams, including the Wilson Dam in northern Alabama.

James T. Taylor, 77, active in the construction business in the Southwest for more than 55 years, died at Fort Worth, Tex., March 11.

William J. Welsh, 81, Lenox, Mass., superintendent of highways for 40 years, died March 14. He had been employed by the town for 60 years.

James B. Rendle, Sr., 70, founder and head of the marine construction company bearing his name, died March 15, at his home in Malden, Mass. He built the Wiggin Marine Terminal in Boston, the Biddeford-Saco, Me., bridge, Deer Island Lighthouse, Camden, N. J., terminals and other large marine engineering projects.

Henry M. Ross, 87, former member of the contracting firm of Ross & Dana, Lowville, N. Y., died March 14. He had been associated with James Dana for more than 18 years.

Charles G. Toms, 60, industrial constructor, died at Toronto, Ont., March 16. A graduate of the University of Toronto, Mr. Toms founded Toms Contracting Co. Ltd., 40 years ago.

Edmund W. Roberts, 80, consulting engineer, died at Cincinnati, Ohio, March 13. He headed the Aeronautics Bureau for two years during the first world war.

David Albert Redding, 64, construction engineer died in Muskogee, Okla., March 12. He had lived in Muskogee for 48 years and supervised construction of many of the city's larger buildings.

Harry C. Webster, 56, president and general manager of the Webster Construction Co., Chicago, Ill., died March 16. He was graduated from the department of civil engineering, University of Illinois, in 1914.

William Joseph Bruce, 69, died at Lansing, Ont., March 6. A graduate of the University of Toronto, he was connected with many hydro-electric projects. He engineered the reconstruction of the Saint John, N. B., docks in 1932 after they had been destroyed by fire. During the war, he was executive engineer of the Canadian Allied War Supplies Commission.

John S. McQuade, 66, engineer and building contractor, died at Philadelphia, Pa., March 10. He was a graduate of Drexel Institute of Technology and had been engaged in the construction business for the last 45 years. During the war his firm was in charge of enlarging the United States Naval Base at Cape May, N. J.

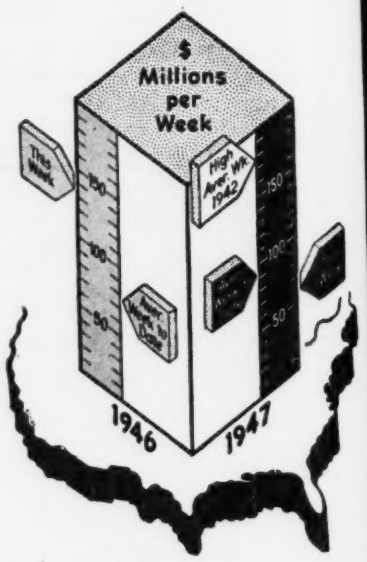
Albert C. Mozen, of Decatur, Ga., construction engineer on the Clark's Hill Dam project at Augusta, died March 16. He had worked on the Oak Ridge atomic energy plant.

Eugene Clyde Larue, 67, a hydraulic engineer who had been consulting engineer for Los Angeles and flood control engineer for Los Angeles County, died in Pasadena, Calif., March 22.

Mr. Larue, a civil engineer graduate of the University of California, 1904, was with the U. S. geological survey until 1927, investigating water problems in the west.

Royall D. Bradbury, 64, special assignment engineer with the department of design of the Public Roads Administration, died March 21, in Washington, D. C. Mr. Bradbury, a native of Jefferson City, Mo., was educated at the University of Missouri and took a graduate degree in civil engineering at Massachusetts Institute of Technology. Before joining PRA Mr. Bradbury was engineer-director of the Wire Reinforcement Institute in Washington, D. C. from 1930 to 1945.

CONSTRUCTION ACTIVITY



As Reported this week to ...
Engineering News-Record

CONTRACT VOLUME

Continental U. S. Only (Thousands of Dollars)

	Week of Mar. 27 1947	Cumulative 1947 (13 wks.)	Cumulative 1946 (13 wks.)
Federal	$5,740	$87,492	$109,925
State & Mun.	20,753	305,853	216,968
Total Public	$26,493	$393,345	$326,893
Total Private	33,639	794,531	653,390
U. S. Total	**$60,132**	**$1,187,876**	**$980,283**

WHERE CONSTRUCTION ACTIVITY ORIGINATED THIS WEEK

Dollar Volume (Thousands)

Type of Work	This Week	Cumulative 1947 (13 wks.)	Cumulative 1946 (13 wks.)
Waterworks	$2,214	$27,360	$26,968
Sewerage	1,051	20,375	12,156
Bridges	1,886	35,083	24,389
Highways	7,488	122,077	111,830
Earthwork, Waterways	2,365	28,773	69,665
Buildings, Public.	10,422	111,947	60,749
Industrial	11,266	190,779	253,911
Commercial ...	21,879	489,962	360,050
Unclassified	1,561	161,520	60,565

NOTE: Minimum size projects included are: Waterworks and waterway projects, $22,500; other public works, $40,000; industrial buildings, $55,000; other buildings, $205,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1947 (13 wks.)	Cumulative 1946 (13 wks.)
NON-FEDERAL	$256,004	$198,898
Corporate Securities	29,223	79,847
State and Municipal	226,781	119,051
FEDERAL	.....	158,320
**Total Capital ..... **	**$256,004**	**$357,218**

ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost....	Mar.	391.95	188.41
Building Cost.....	Mar.	298.84	161.54
Volume	Feb.	197	86